INITIAL STATEMENT OF REASONS

CALIFORNIA STATE LANDS COMMISSION

REGARDING THE 2001 CALIFORNIA BUILDING CODE, CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2

MARINE OIL TERMINALS, CHAPTER 31F

SECTION 3101F - INTRODUCTION

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE:

This section gives a brief overview of the formation of the Marine Facilities Division (Division) of the California State Lands Commission (Commission) and the development of Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which are hereby being codified into the California Building Code (Code). It explains the purpose of the standards and that they apply to all marine oil terminals (MOT) in California. There is a brief overview of each of the subsequent sections explaining what is required for determining that the regulated MOTs are fit-for-purpose. The section encourages the use of risk reduction strategies for reducing the potential for oil spills. This section specifies reviews of engineering analyses performed as a result of the guidance in this Code and indicates that the Division may review and approve these analyses and any design of structures and installation of equipment.

Section 3101F is a means of introducing the regulated community, owners and operators of marine oil terminals, in California, to the requirements of this Code. It is necessary to spell out the purpose of these standards, which is to establish minimum engineering, inspection and maintenance criteria for MOTs in order to prevent oil spills and to protect the public health, safety and the environment. This Code will ensure that the MOTs can be safely operated within their inherent structural and equipment related constraints. It is equally necessary to explain the applicability of this Code; all of the marine oil terminals in California fall under these standards.

Marine oil terminals are rated, in following sections, according to the risk for a major oil spill. It is important to allow owners and operators of MOTs to employ strategies to reduce the potential size and therefore the overall risk of oil spills. Reducing these risks may enable use of less aggressive standards.

This Code requires technical engineering analyses of the wharf, trestle structures, mooring and berthing of vessels and the soil beneath the terminal. While these analyses are to be performed by engineers registered in California, due to the complex nature of this work and the fact that the engineering staff of the MFD has discovered errors on several other studies, it is advisable and necessary to have quality assurance performed by other engineers. Even so, the MFD reserves the right to review and approve analysis and design, to ensure that that this Code has been followed.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS:

The Commission did not rely upon any technical, theoretical or empirical studies, reports or documents for this section (3101F) of the Code.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, regarding this section of the Code.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The Commission finds that the adoption of these regulations, including this Section 3101F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Section 3101F of the Code will not have an adverse economic impact on any business. It is merely an overview of the rest of the document, which may have adverse impacts on business. These impacts will be discussed separately for each section of the Code in the following pages

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3101F of the Code does not specify any Code of Federal Regulations (CFRs), however, other sections do specific conformance with certain CFRs in addition to the specific requirements of the particular section. Discussion for each section follows.

SECTION 3102F - AUDIT AND INSPECTION

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

This section of the Code defines minimum requirements for an audit, which is a comprehensive inspection and evaluation of the structural, mooring, geotechnical, mechanical and electrical components and systems of a marine oil terminal. It also specifies the other types of inspections that are or may be required and the information needed to ensure completeness of those assessments. It also defines a schedule for the initial and subsequent audits and timelines for the completion and submission of reports to the Division. This section defines a “Condition Assessment Rating” for structural deficiencies and a “Remedial Action Priority” for electrical, piping and mechanical deficiencies discovered during the audit. The deficiencies are prioritized and the terminal operator and the Marine Facilities Division mutually agree upon a schedule for completion of corrective or “follow-up” actions. The ratings provide guidance, as to whether or not the terminal should remain operational. Various levels of deficiencies could cause the terminal to reduce the maximum vessel size allowed to berth, limit operations or not use a portion of the wharf, or other operational restrictions. The ratings remain in effect until corrected, or evaluated during the subsequent audit.

This section provides the professional requirements for the audit team, a group of multi-disciplinary engineers and others, who perform the audits.

Section 3102F spells out the items and analyses needed to determine if the MOT is “fit-for-purpose,” or in other words capable of operating safely in all aspects (structural, mooring and berthing, mechanically, and electrically), and subsequently minimizing the risks to the public health, safety and the environment.

A procedure to follow for the audit report is provided. Specific references are cited, which provide additional information and support for topics as necessary.

Figure 2-1 presents a form, which when filled-in by the MOT owner or operator during the audit, provides a summary of the operating limits of the berthing system.

The Marine Facilities Division was formed in late 1990. Since that time the Division's engineering staff and marine safety inspectors have conducted numerous inspections of the marine oil terminals (MOT) in California. The newest terminal is about 20 years old; some are as much as 80 years in age; the average age is 50 years. Since these MOTs were built, earthquake engineering has greatly progressed, and our knowledge and understanding of the seismic effects on marine structures (lateral and vertical acceleration and the resulting forces) has increased. This information has resulted in many facilities, such as refineries, being upgraded to better withstand the effects of a substantial earthquake. The terminals have not had this type of upgrade and in fact present a weak link in the petroleum transportation process.

Other systems, such as electrical and mechanical, including the firefighting, may be deficient. Firefighting systems are generally a bit arcane and only rarely are comparable to newer facilities around the world. In order to comply with this Code, many of these items will be required to be upgraded. The original designs of these items assumed vessels of a specific size; today's modern tank vessels are significantly larger than those for which the MOTs were originally designed. As a result, the greater wind and current loads on the vessels may require upgrading of mooring hardware and support points.

As such it is necessary to perform in depth inspections (audits) and engineering analyses on these MOTs to ascertain their existing strengths and weaknesses and then to recommend upgrading or retrofitting as appropriate. Section 3102F of the Code provides the transition from the potential problem(s) to the potential solutions. These standards will direct the strengthening of the MOTs of California to help ensure better resistance to the effects of future seismic events, higher mooring and berthing loads and the marine environment. It provides the overall guidelines for the inspection and analyses of the MOTs. The sections that follow it are primarily the details to get to the final product, which is the completed audit and the subsequent recommendations for corrections of deficiencies that may be discovered. It is necessary to do this in order to ensure the continued safe operation of the MOTs in California. Section 3102F also imposes schedules for future audits and inspections, so as to sustain the safe operation of MOTs for years to come.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Two technical documents were used in Section 3102F. Both are referenced in square brackets, such as [2.1], at the particular place they are used. They are shown below as they occur in the reference subsection "3102F.5 References".

[2.2] Buslov, V., Heffron, R. and Martirossyan, A., 2001, "Choosing a Rational Sample Size for the Underwater Inspection of Marine Structures," Proceedings, Ports 2001, ASCE Conference, April 29-May 2, Norfolk, VA.

[2.3] Childs, K.M., editor, 2001, **"**Underwater Investigations - Standard Practice Manual," American Society of Civil Engineers, Reston, VA.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The Commission finds that the adoption of this Section 3102F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine Oil Terminal operators can expect an adverse financial effect as a result of this Section 3102F. Section 3102F is in effect the driver for the audit/inspection process, requiring the initial audit and analyses and then any subsequent upgrading or retrofitting deemed necessary by the Audit Team. Costs will vary, depending on the existing condition of the MOT, including but not limited to, its design, age, fitness, location, activity, past damage and environmental corrosion. If a marine oil terminal does not have an engineering staff capable of performing the required engineering analyses, then costs could be substantial. If required, as a result of the audit, rehabilitation or seismic upgrading of the terminal or systems could also be quite expensive.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3102F does not specify that the user shall conform to appropriate requirements of certain sections of the CFRs; however, the following sections may require conformance with various parts of the CFRs. This is done as a reminder to the MOT operators of what the Marine Facilities Division will be scrutinizing, as part of its oversight. Discussion will be forthcoming in each section as necessary.

SECTION 3103F - STRUCTURAL LOADING CRITERIA

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

The specific purpose of this Section 3103F of Chapter 31F of the California Building Code is to set forth the loads, which may be imposed on the structure (e.g. wharf, pier) at a marine oil terminal. These loads consist of various environmental (e.g. wind, earthquake, etc.) and operational (e.g. vessel impact, deck mounted equipment, piping, etc.) vertical and horizontal loads effecting the structure(s). They include dead loads, which consists of the weight of the structure itself and all the equipment permanently attached to it. Live loads are transient loads, such as vehicles on the decks. Earthquake loads may be induced both laterally and vertically by seismic activity. Detailed criteria are provided for two levels of earthquake motion, with different return periods (i.e. seismic loads associated with a 72 and 475 year return period events). For the ports of Los Angeles, Long Beach and Port Hueneme, a detailed probabilistic seismic hazard assessment was performed, and the results are provided. For other areas along the coast, generic mapped information is used as a starting point, and then compared to a site-specific seismic assessment.

Mooring loads consist of forces acting on the moored vessel, which are then transferred to the structure. These forces are generated by wind, wave, current, tidal variations, tsunamis, seiche or the hydrodynamic effects of passing vessels. A critical connection here is that while the mooring lines may be adequate, the structure must also be able to carry the loads. There are also berthing or impact loads, which are the large lateral forces occurring when an arriving vessel pushes or bumps against a wharf or pier. Most of these forces are absorbed by the fendering system, and then the remaining load is transferred to the structure.

In addition to forces acting on the vessel, and then being transferred to the structure, wind and current loads may be imparted directly on the structure when there is no vessel at the MOT. Another important feature of Section 3103F is that it provides loading combinations for marine oil terminals. These are

essential criteria that specify which load is combined with all other loads, in order to design each element of the structure (piles, deck, connections, etc.).

Section 3103F is necessary, because it defines the structural loading criteria that will be used in the required structural analyses. The actual analyses procedures are presented in Sections 3104F-3107F of these Standards. Information in each of the subsections provides parameters for specific analyses that is detailed in those sections.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Twenty-seven technical documents were used in Section 3103F. They are referenced in square brackets, for example, [3.1], at the particular place they provide guidance. They are listed in the reference subsection, "3103F.13 References" of this Section.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the CSLC, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The CSLC finds that the adoption of these regulations, including this Section 3103F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminal operators may expect an adverse financial effect as a result of compliance with Section 3103F. While this section is providing criteria for analyses spelled out in subsequent sections, certain facets do need the expertise of structural engineers. Many MOTs do not have structural engineers on staff and will need to hire a consulting engineering firm to perform the analyses required. Costs will vary, depending on the size of the existing MOTs. Larger facilities will require an analysis that will take more time and thus cost more than smaller, less complex facilities.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3103F does not specify that the user shall conform to appropriate requirements of certain sections of the CFRs, however following sections may require conformance with various parts of the CFRs. This is done as a reminder to the MOT operators of what the Marine Facilities Division will be scrutinizing, as part of its oversight. Discussion will be provided in each section as necessary.

SECTION 3104F - SEISMIC ANALYSIS AND STRUCTURAL PERFORMANCE

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

The specific purpose of Section 3104F of the Code is to define the seismic risk for various categories of marine oil terminals and give direction as to how to perform seismic analyses for these facilities. Very specific seismic performance criteria are provided for two levels of earthquakes. For the Level 1

earthquake, the structure should survive with minor or no structural damage; for the Level 2 earthquake, there may be some localized structural failures, but there is to be no collapse, nor is there to be a major oil spill.

Various structural modeling techniques are provided, along with guidance to determine structural damping, which may change as the structure deforms. The section also provides direction as to how to combine forces and displacements from various directions, and provides criteria to evaluate the relationship between vertical load and lateral displacement resulting in an additional moment for the structural analysis/design.

The information presented in this section guides the engineer as to what procedures may be used to perform the required seismic analysis. While these procedures may be obvious to structural engineers, it ensures that they don't overlook a usable procedure and that the work is done appropriately. This is necessary because the MFD engineering staff has discovered numerous errors over the years by engineers hired to perform analyses and design work for the MOTs here in California.

This section of the Code is necessary, because it discusses the required seismic analyses and the structural performance expected for marine oil terminal structures in order for them to better withstand seismic events or other damaging events and still be as functional as possible.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Four technical documents were used in Section 3104F. They are referenced in square brackets, for example, [4.1] at the particular place they provide guidance. They are listed in the subsection, "3104F.8 References".

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The Commission finds that the adoption of these regulations, including this Section 3104F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminal operators can expect an adverse financial effect as a result of compliance with Section 3104F. This section is providing criteria for seismic analyses and defining what level of structural performance should be expected of the wharf, pier, etc. Depending on the results of these analyses, the owners and or operators of these facilities could face expensive retrofits or upgrades to ensure the performance level defined in this section. Also, many MOTs do not have structural engineers on staff and will have to hire a consulting engineering firm to perform the analyses required. Costs will vary, depending on the size of the existing MOTs. Larger facilities will require an analysis that will take more time and thus cost more than smaller, less complex facilities.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3104F does not specify that the user shall conform to appropriate requirements of any CFRs.

SECTION 3105F - MOORING AND BERTHING ANALYSIS AND DESIGN

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

The specific purpose of Section 3105F of the Code is to provide criteria to perform and evaluate berthing and mooring analyses for oil tank vessels. The level of sophistication of the analysis is dependent upon the risk, which includes consideration of maximum wind speed and direction, maximum water current and other variables. The various methods to perform these calculations are clearly specified. One relatively new calculation is required to evaluate the hydrodynamic effects of passing vessels, as they create loads on the mooring lines of the vessel moored at the dock. The section also provides guidance for the placement of dolphins for new marine oil terminals. A dolphin is an independent structure used to provide lateral support for mooring line loads or for vessel impact.

This section is necessary, because its criteria to ensure that the berthing and mooring of tank vessel at MOTs is as safe as possible. These operations can be dangerous, resulting in injury or death to personnel and damage to the terminal structure and equipment such as loading arms (moveable piping that conveys oil between the tank vessel and the terminal), which in turn can result in a major oil spill to the waters of the state.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Eleven technical documents were used in Section 3105F. They are referenced in square brackets, for example, [5.1], at the particular place they provide guidance. They are listed in the subsection, “3105F.7 References”.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The Commission finds that the adoption of these regulations, including this Section 3105F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminal operators can expect an adverse financial effect as a result of this Section 3105F. The section is providing criteria for required analyses, which probably will have to be performed by structural engineers. Many MOTs do not have structural engineers on staff and will need to hire a consulting engineering firm to perform the required analyses. Costs will vary, depending on the size of the existing MOTs. Larger facilities will require an analysis that will take more time and thus cost more than smaller,

less complex facilities.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3105F does not specify that the user shall conform to appropriate requirements of certain sections of the CFRs.

SECTION 3106F - GEOTECHNICAL HAZARDS AND FOUNDATIONS

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

The purpose of Section 3106F of Chapter 31F of the California Building Code is to provide direction for the evaluation of liquefaction or other types of soil failure at a marine oil terminal. Site-specific geotechnical information is required to evaluate the safety factor against liquefaction. Various other ground failures are discussed, and methods to predict resulting motion are presented. The majority of MOTs in the state are situated on very weak or liquefiable soils, it is crucial to identify the areas where most damage is likely to occur from a seismic event, so as to guide possible mitigation measures.

This section is necessary, because it is essential to know the geotechnical hazards and the soil liquefaction potential in the area of the marine oil terminal, pipeline trestle and pipeline supports on shore. The MFD engineering staff has observed post-earthquake ground failure and liquefaction in port and harbor areas. If the soil fails or liquefies, the structural assessment will be effected. The loads applied by the shifting soils increase the forces on structural components of the dock along with the resulting forced displacement of the structure. This section provides the engineering methods to address these problems.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Twelve technical documents were used in Section 3106F. They are referenced in square brackets, for example, [6.1] at the particular place they provide guidance. They are listed in the subsection, “3106F.8 References”.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, even though two large workshops and several review sessions were held; each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The Commission finds that the adoption of these regulations, including this Section 3106F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminal operators can expect an adverse financial effect as a result of this Section 3106F. This section provides criteria for required analyses, which will have to be performed by geotechnical engineers. MOTs do not normally have geotechnical engineers on staff and will have to hire a consulting engineering

firm to perform the required analyses. Costs will vary, depending on the size of the existing MOTs. Larger facilities will require an analysis that will take more time and thus cost more than smaller, less complex facilities.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3106F does not specify that the user shall conform to appropriate requirements of certain sections of the CFRs.

SECTION 3107F - STRUCTURAL ANALYSIS AND DESIGN OF COMPONENTS

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

The purpose of Section 3107F is to provide performance criteria for piles, the pile/deck interface and individual components, subjected to seismic, berthing, mooring and other loadings. Material properties for existing concrete or steel structures are provided, along with a “knowledge factor” when exact material properties are unknown. Stress-strain (performance) of concrete or concrete with pre-stressed piles is provided. Non-vertical (batter) piles are also discussed, as they carry more of the lateral loads (seismic, mooring and berthing) than the vertical piles.

Timber piles are also discussed, with performance criteria for lateral loads, as well as specific mooring and berthing components.

Section 3107F is necessary, because it provides the detailed minimum performance standards for concrete, steel and timber structural components. It prescribes evaluation procedures for various configurations, such as the pile and wharf deck interface, areas of evaluation along a pile’s length, and other specific areas. These procedures are used to find the structural displacement that is then compared to the prescribed maximum criteria values. If the structural displacement (due to earthquake or other loads) is less than the capacity of the specific region or element, then that component is determined to be acceptable. If the resulting displacement is higher than that provided in the criteria, then some sort of structural strengthening is required. This methodology is called “performance-based design”.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Eleven technical documents were used in Section 3107F. They are referenced in square brackets, for example, [7.1] at the particular place they provide guidance. They are listed in the subsection, “3107F.6 References.”

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The Commission finds that the adoption of these regulations, including this Section 3107F of the California Building Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminal operators can expect an adverse financial effect as a result of this Section 3107F. This section provides criteria for required analyses, which will have to be performed by structural engineers. MOTs do not normally have structural engineers on staff and will have to hire a contracting engineering firm to perform the analyses required. Costs will vary, depending on the size of the existing MOTs. Larger facilities will require an analysis that will take more time and thus cost more than smaller, less complex facilities.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3107F does not specify that the user shall conform to appropriate requirements of certain sections of the CFRs.

SECTION 3108F - FIRE PREVENTION, DETECTION, AND SUPPRESSION

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

This section, 3108F, provides minimum standards for fire protection, detection, and suppression at marine oil terminals. Requirements are spelled out for “new” and “existing” marine oil terminals. The terminals must meet requirements of specified incorporated state and federal regulations (e.g. CFRs and CCRs), codes (e.g. National Electric Code) and standards (e.g. American Petroleum Institute (API) Standard 2610), as well as the specific requirements of the section. There are also guidance documents cited and referenced to provide information to the user, in regard to the subject of the section.

The Marine Facilities Division was formed in late 1990. Since that time the Division’s engineering staff and marine safety inspectors have conducted numerous inspections of the marine oil terminals (MOT) in California. These terminals were built over an approximate 60-year period, the most recent being about 20 years old. As observed, their fire fighting systems present a wide range in sophistication and capability; most have not upgraded their equipment in many years and appear minimal at best. Only a few seem to be capable of addressing a major fire, which could occur on the wharf. When transferring flammable liquids (oil), the potential for fire always exists. Combine this with the fact that there are more and larger tankers calling at these terminals and it is likely that the fire potential has increased over the lifetime of these MOTs. They were, for the most part designed for vessels much smaller than those that now berth at them. It is therefore necessary and this section of the Code directs the terminals to conduct a fire hazard assessment and risk analysis to determine if the existing fire fighting capability is adequate to combat a fire, even after a sizable seismic event, wherein commercial electrical power may be lost. The risk determination will guide the terminal(s) to possibly upgrading their fire prevention, detection and suppression system(s). Based on this risk, the Code requires a detailed fire plan to be prepared by a registered engineer. The terminal is required to have specified minimum fire suppression capability.

MFD staff has first hand knowledge of a fire at a marine terminal. That terminal had fire-fighting equipment similar to that commonly observed at MOTs. Even though the fire did not involve petroleum liquids, it quickly got out of control, destroying the fire suppression system itself and consuming the wharf. Upgraded fire equipment, as required by this section of the Code, could have minimized damage.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

The tenets of Section 3108F of the Code are based on a number of documents cited in a reference subsection (see subsection 3108F.7). Documents cited include, for example those from the American Petroleum Institute (API), the Oil Companies International Marine Forum (OCIMF) and National Fire Protection Association (NFPA). They provide the user with guidance in all phases of this section, from fire hazard assessment and risk analysis to the guidance on marine terminal fire protection. Eight technical documents were used in Section 3108F. They are referenced using square brackets, for example, [8.1] at the particular place they provide guidance. They are listed in the subsection, “3108F.7 References”.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the Commission, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The CSLC finds that the adoption of these regulations, including this Section 3108F will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine Oil Terminal operators can expect an adverse financial impact as a result of this Section 3108F. Cost would be some increment of the total costs to implement these proposed modifications (Chapter 31F) to the California Building Code. Depending on the required audit (inspection and analysis) results, which include the fire hazard assessment and risk analysis, costs could be minimal or quite expensive. A marine oil terminal operator possibly might have to pay for a registered engineer to generate or update the terminal fire plan. Additional, possibly significant costs could be incurred to upgrade the fire fighting system. This could entail such things as the installation of new piping and fire cannons, larger firewater pumps, etc.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3108F specifies that the user shall conform to appropriate requirements of certain sections of the CFRs and the CCRs, in addition to other specific provisions of the section. Even though the MOT operators already have to comply with these federal and state regulations, this is not a duplication of these regulations, but a reminder to the regulated community of what the Marine Facilities Division will be scrutinizing in the MOTEMS.

SECTION 3109F - PIPING AND PIPELINES

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

The specific purpose of this section (3109F) is to prescribe minimum safety standards for piping, pipelines, their anchors and supports and appurtenances (valves, pumps etc.) in existing and new marine oil terminals. The piping and pipelines include those used for movement of oil, oil products, vapors, volatile organic compounds, inerting gases, enriching gases, natural gas, fire water, foam, nitrogen, compressed air; including all piping for venting, striping, sampling and utilities. The requirements for stress analysis of pipelines follow

current industry standards and account for all relevant loads, including thermal and seismic displacements calculated from the structural assessment.

Prescription of standards for piping, pipelines, their anchors and supports and appurtenances (valves, pumps etc.) is necessary because they are the means by which oil is conveyed from the tank vessels to the shore terminal (and vice versa). The effective design and construction of piping and its supports is necessary to ensure that no oil is spilled. The piping becomes an integral part of the MOT structure (wharf, pier) and this relationship must be analyzed to assure the protection of the public health, safety and the environment. This section of the Code provides guidelines for the analysis.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Twelve technical documents were used in Section 3109F. They are referenced in square brackets, for example, [9.1], at the particular place they provide guidance. They are listed in the subsection, "3109F.7 References".

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the CSLC, even though two workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The CSLC finds that the adoption of these regulations, including this Section 3109F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine Oil Terminals can expect an adverse financial impact as a result of this Section 3109F. Depending on the required audit (inspection and analysis) results, which may include a pipeline analysis (required if the structural analysis indicates the possibility of relatively large displacements of the structure from a seismic event), costs could be minimal or quite expensive. A marine oil terminal possibly might have to pay for a registered engineer to perform a pipeline analysis. Costs will vary, depending on the size of the existing MOTs. Larger facilities will require an analysis that will take more time and thus cost more than smaller ones. Additionally, possibly significant costs could be incurred to upgrade the piping system. This could entail such things as the installation of new piping or upgrading of the piping supports.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3109F specifies that the user shall conform to appropriate requirements of certain sections of the CFRs and the CCRs, in addition to other specific provisions of the section. Even though the MOT operators already have to comply with these federal and state regulations, this is not a duplication of these regulations, but a reminder to the regulated community of what the Marine Facilities Division will be scrutinizing in this Chapter (31F) of the Code.

SECTION 3110F - MECHANICAL AND ELECTRICAL EQUIPMENT

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

Section 311F0 provides minimum standards for mechanical and electrical equipment located at marine oil terminals. Specific equipment covered are marine loading arms, oil transfer hoses, lifting equipment, terminal provided shore-to-vessel access, sumps, discharge containment, vapor control systems, and also equipment anchors and supports. The standards provide an acceptable level of safety, maintenance and reliability for this equipment.

Section 311F0 of the Code is necessary, because it provides guidance for the installation, operation and maintenance of mechanical and electrical equipment at MOTs.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Twenty-nine technical documents were used in Section 3110F. They are referenced in square brackets, for example, [10.1], at the particular place they provide guidance. They are listed in subsection, “3110F.9 References”.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the CSLC, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The CSLC finds that the adoption of these regulations, including this Section 3110F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminal operators can expect an adverse financial impact as a result of this Section 3110F. It is possible that some of the equipment at an MOT may need to be replaced or upgraded depending on the results of the required audit. In the experience of MFD staff work and costs are usually minimal relative to a structural repair. An example would be the repair or replacement of electrical items, such as a broken conduit or the need for an upgraded switch.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3110F specifies that the user shall conform to appropriate requirements of certain sections of the CFRs and the CCRs, in addition to other specific provisions of the section. Even though the MOT operators already have to comply with these federal and state regulations, this is not a duplication of these regulations, but a reminder to the regulated community of what the Marine Facilities Division will be scrutinizing in this section of the Code.

SECTION 3111F - ELECTRICAL SYSTEMS

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE.

Section 3111F provides minimum standards for electrical systems and components located at marine oil terminals. Topics covered are requirements for: equipment and components located hazardous area classified areas, electrical service, grounding and bonding, system and component specifications, minimum illumination, operations of communication and control systems, and corrosion protection. The standards herein provide a minimum acceptable level of safety, maintenance and reliability.

This section of the Code is necessary, because it provides requirements and guidance for the installation, operation and maintenance of electrical systems at MOTs.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS.

Fiftenn technical documents were used in Section 3111F. They are referenced in square brackets, for example, [11.1], at the particular place they provide guidance. They are listed in the subsection, “3111F.11 References”.

CONSIDERATION OF REASONALBLE ALTERNATIVES.

No other alternatives were presented to or considered by the CSLC, even though two large workshops and several review sessions were held, each of the workshops and the review sessions were well attended by the regulated community (MOT owners and operators), consulting engineers and members of academia.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

The CSLC finds that the adoption of these regulations, including this Section 3111F of the Code will not have a significant adverse economic impact on small businesses. None of the business that will be governed by these proposed regulations can be considered to be a "small business" as defined in Government Code Section 11342.610.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

Marine oil terminals can expect an adverse financial impact as a result of this Section 3111F. It is possible that some portion of an electrical system at an MOT may need to be replaced or upgraded depending on the results of the required audit. Depending on the extent of the system, the cost may be substantial or minimal.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS.

Section 3111F does not specify that the user shall conform to appropriate requirements of certain sections of the CFRs, however following section may require conformance with various parts of the CFRs. This is done as a reminder to the MOT operators of what the Marine Facilities Division will be scrutinizing, as part of its oversight.